DATA CENTER OPERATIONS BRANCH

NDS OPERATIONS PROCEDURE MANUAL
NO. P-C005

SYSTEMS SW & HW
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CMS LEVEL 7 (OPR. INSTRUCTION FOR CMS)

SYMBOLIC TITLE: N/A
ORIGINATOR: [redacted]

STAT

P-C005

CMS Level 7

PSG/CSD/PB-024/82
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MEMORANDUM FOR: Chief, Data Center Operations Branch, CSD/PSG/NPIC

FROM : [redacted] STAT
Chief, Programming Branch, CSD/PSG/NPIC

SUBJECT : Operating Instructions For CMS

1. Attached is Section 2 of the CMS Operator Reference Manual (UP-8745) that we have annotated for our specific use at NPIC. We have also crossed out those portions of the document that are not applicable here.

2. Please make the appropriate changes to all copies of the document that you hold.

[redacted] STAT

2. Operator Reference

2.1. General Description

The Communications Management System (CMS) is a program designed to allow the Series 1100 Executive System to communicate remotely with a variety of computer users. CMS runs as a user program in the real-time mode, and handles messages between the Series 1100 Executive System and many devices.

The communications devices handled by CMS are logically grouped as a hierarchical communications network. At the lowest level are devices or sessions (for example, a single terminal). Groups of sessions are called ports in Telcon networks and Poll Entities in GCS networks. Groups of ports or Poll Entities are known as Lines in GCS networks and NETs in Telcon networks. Groups of one or more NETs are controlled by small dedicated computers called Front End Processors (FEPs). Each FEP uses one or more physical channels. See Figure 2-1 for a diagram of a sample Telcon network.

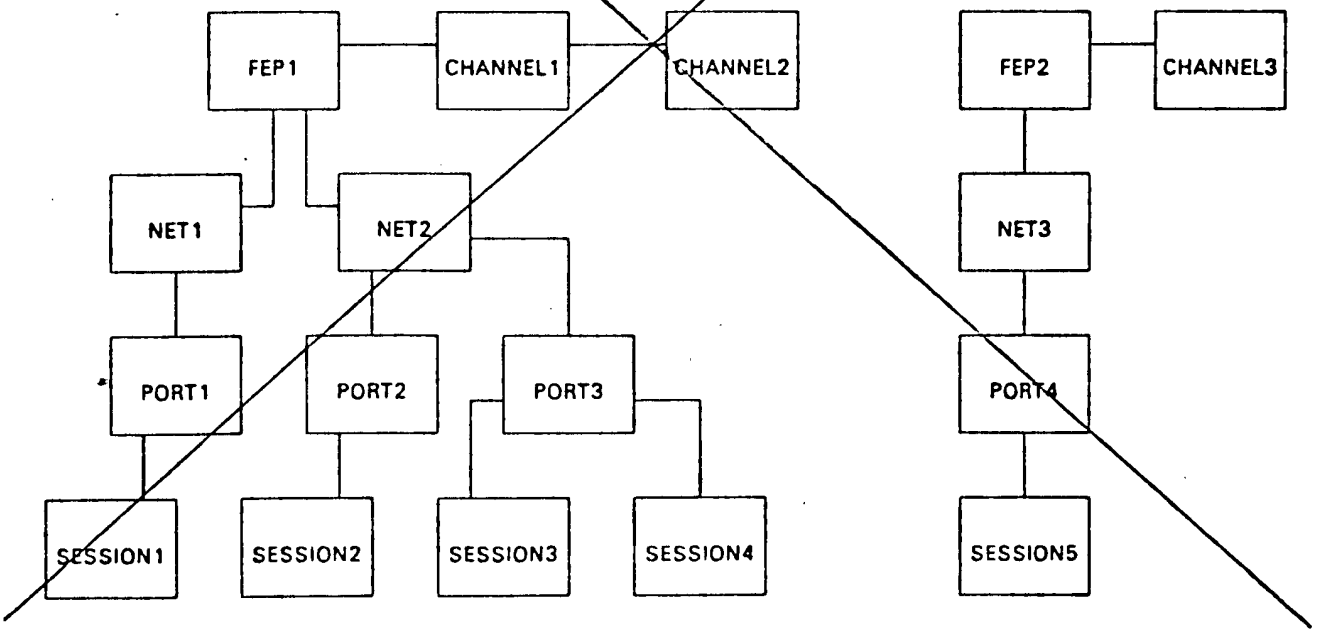

Figure 2-1. Example of a Telcon Network

The operator starts and stops CMS, turns on statistical collection and trace functions, and control the state of the network by upping and downing FEPs or channels, switching groups of devic ror one FEP to another, and manipulating message queues.

2.2. Using CMS

2.2.1. Starting CMS

CMS may be started in any of the ways available for starting user programs: by ST keyin on th operator's console, batch runstream, etc. It may be convenient to start CMS automatically from th system initialization runstream. The method of starting CMS may vary from site to site, and loca operational procedures should be consulted. However, Sperry Univac does provide a standar runstream for starting CMS. When this method is to be employed, CMS may be started by the keyin

ST *qual* *~~UTILITY~~FILE.CMSRUN,*n,run-id,account-number* or ST CMS (at NPIC)

If *n* = 1, the recovery file is reinitialized (recovery not attempted). If this field is blank, recover is attempted. If the *run-id* field is blank, the run-id defaults to CMS7.

When CMS acquires real-time status in the system, the CMS sign-on message, containing the CM level designation, start date, and time, is displayed at the system console. If the CMS audit functio is present (see 2.2.6), the audit file initialization message is then displayed. If debug code is turne on, the following message appears:

INITIALIZE CMS ANS: GO

When the operator responds with 'GO', CMS initialization of CTMC, GCS, or C/SP lines (or F~Ps i Telcon systems) takes place. If any CTMC, GCS, or C/SP line in the CMS configuration ca. ..ot b assigned or initialized (excluding dial-up lines) the following message is displayed:

COULD NOT INIT LTT *nnn ssuu cc* (EXEC Level 33 or earlier)
COULD NOT INIT LTT *nnnxxxxxx* (EXEC Level 35 or later)

where:

nnn is the line number in the CMS configuration

ssuu is the subsystem and unit number of the line

cc is the C/SP number, zero if not a C/SP line

xxxxxx is the absolute device name used to assign the line

Following the CTMC, GCS, or C/SP line initialization, Telcon FEP initialization is started. For each FE that is marked down (DN) in the CMS configuration, the following message is displayed:

fepname IS DOWN

For each FEP that is marked 'UP' in the CMS configuration, CMS initialization attempts to assign a channels connecting this system to the FEP. If at least one channel is successfully assigned per FE CMS attempts to initialize the Telcon software in the FEP, if the FEP is already loaded and runnin When this initialization is successfully completed, the following message is output:

fepname INITIALIZED ON CHANNEL *channel-name*

If CMS is unable to assign at least one channel for a FEP, the following message is displayed:

TIMEOUT *fepid*. RETRY(R), SWITCH (SW) OR DOWN?

The operator responds:

R	Retry channel initialization
SW to *fepid*	Switch all nets on timed-out FEP to *fepid* and down timed-out FEP
D	Down timed-out FEP

2.2.2. CMS Consoles

~~CMS and the operator communicate with each other through a console. The console may be a host system console or a GCS Network Monitor Terminal (see 2.2.2.2). When Telcon is in the system and the configuration allows, the operator may control Telcon through the system console as well as Telcon's own console.~~

2.2.2.1. Series 1100 Operator's Console

CMS can communicate through any standard EXEC console configured for the communications console class. Thus, the console may be the standard onsite console, a special-site communications console, or a remote batch console.

~~All Telcon-type CMS commands are handled through this console. (See 2.3.3, Telcon commands.) All GCS-type commands (see 2.3.2, GCS commands) are handled through this console unless a Network Monitor Terminal has been designated (see 2.2.2.2). If the configuration allows, Telcon Network Management (NMS) commands can be handled through this console as well as through Telcon's own console. (See 2.2.2.3.)~~

~~2.2~~2.2.2. Network Monitor Terminal (Remote GCS Terminal)

One scope in a GCS Network may be designated as the Network Monitor Terminal (NMT) when CMS is generated. The NMT can be either the operator's console or a remote terminal (UNISCOPE Display Terminal or UTS 400). All GCS commands (commands preceded by the GCS sentinel character, which is configurable, defaulting to /) must go through the NMT. The operator can change the NMT to another terminal via the /CHG command (see 4.3.2.3.18). /CHG TO changes the NMT to the Series 1100 operator's console.

Network control responses are sent to the UNISCOPE display terminal or UTS 400 terminal by using the MESSAGE WAITING indicator light and bell alarm. The message is held in the terminal's deferred queue until the terminal operator calls for it by pressing the MESSAGE WAITING key. This allows the terminal operator to make a number of network control commands while retaining control of the display until the responses are called for. Input and output control on the DCT 500 and DCT 1000 are maintained differently and network control responses are printed when the terminal operator has completed an input.

2.2.2.3. Telcon Console

There is a special Telcon console which controls the DCPs in a Telcon network through Telcon NMS commands. However, if the system configuration permits, the operator at the Series 1100 operator's console can communicate with Telcon using the following keyin:

II *run-id* CMSTEL

where *run-id* is the CMS run identifier. If the NMSPID is invalid or there are multiple FEPs in the configuration, then the system responds:

ENTER TELCON NMS SESSION NAME

The operator must enter the CMS session name of the terminal designated as Network Monitor Session for one of the configured DCPs. The system then displays:

ENTER TELCON NMS COMMAND

and the operator responds with a Telcon NMS command (see SPERRY UNIVAC Telcon, Operator Reference, UP-9106 (current version) or END to terminate input mode.

2.2.3. Statistics

Statistics keyins can be entered only from the computer console via the II keyin EXEC request. The format is:

II *run-id*

CMS responds with a read/respond message:

number ENTER FUNCTION

The operator then enters:

number function

When all statistics function requests have been entered, the operator keys in:

number END

Statistics gathered by CMS are comprised of three categories called System Events, System Data, and Network Data. Network Data statistics are gathered only for GCS or C/SP network entities — lines, poll entities, and devices. They are not gathered for Telcon network entities at this time. The ability to gather Network Data statistics or not is a system generation option. System Events and System Data are general CMS categories applicable to both GCS and Telcon systems. These categories are always enabled.

NOTE:

In the event of a system crash, or a CMS fatal contingency, the statistics gathered are lost.

2.2.3.1. Statistics Commands

The System Events statistics consist of the following counters:

Number of ER IO$s executed
Number of TIP FC read and write ERs executed
Number of ER ADHs executed
Lowest level of each CMS system buffer pool
Number of storage COMPOOL requests and number of requests rejected
Number of ER DACTs executed (CMS idle)

The System Data statistics consist of the following counters:

Number of TIP messages received and sent
Number of demand messages received and sent
Number of batch messages received and sent
Minimum in-TIP transaction turnaround time
Maximum in-TIP transaction turnaround time
Average in-TIP transaction turnaround time

The TIP message counted is the unit of hand-off between CMS and TIP. The demand message counted is also the unit of exchange between the CMS RSI interface activities and the CMS mainline activity, i.e., one UDU. Note that this UDU may contain multiple lines of data, depending on the lines/UDU packing factor configured. The batch message counts reflect all NTR and REM-1 sessions in the system. Again, the UDU is counted, and this unit, exchanged between CMS mainline and the RSI or NTR interface functions in CMS may contain multiple lines of data.

The Network Data statistics consist of the following counters:

For lines (LTTs)

Number of ESI interrupts
Number of timeouts
Number of communications contingencies

For poll entities (PETs)

Number of polls
Number of timeouts
Number of resends
Number of retransmits
Number of no-traffics

Poll Entity statistics are not maintained in C/SP networks.

For devices (DETs)

Number of messages received
Number of messages sent
Number of resends
Number of retransmits

2.2.3.1.1. ST SE (Start System Events)

System events consist of:

Number of I/Os done
Number of TIP FC reads and writes
Number of CMS DACTs
Number of storage COMPOOL requests and number of requests rejected
Lowest level of each CMS system buffer pool

2.2.3.1.2. ST SD (Start System Data)

System data consists of:

Number of TIP messages received and sent
Number of demand messages received and sent
Number of batch messages received and sent
Minimum TIP transaction turnaround time
Maximum TIP transaction turnaround time
Average TIP transaction turnaround time

2.2.3.1.3. ST SDE (Start System Events and System Data)

The ST SDE command is a global command to start both system events and system data.

2.2.3.1.4. ST ND (Start Network Data for LTT, PE, or DT)

ST ND LT n_1, n_2, n_3 ...
ST ND PE *a/b, c/d, e/f* ...
ST ND DT p_1, p_2, p_3 ...

Network data (CTMC, GCS, or C/SP systems only) consists of:

For lines

Number of interrupts
Number of time-outs
Number of bad PIDs received
Number of communications contingencies received

For polls

Number of polls
Number of time-outs
Number of resends
Number of retransmits
Number of no-traffics

For devices

Number of messages received
Number of messages sent
Number of resends
Number of retransmits

2.2.3.1.5. ST ALL (Start All Statistics Data Collection)

The ST ALL command turns on as many statistic collection flags as possible, limited only by the amount of allocated buffer space. Buffer space for statistics collection is allocated via the STATS SGS at system generation time.

2.2.3.1.6. SP Command (Stop Statistics Collection and Dump)

SP - - - - - -

The SP (in place of ST) command followed by one of the above keyins stops statistics gathering for that particular parameter. It will also cause the current statistics values to be dumped.

2.2.3.1.7. MON (Monitor) Command

The syntax of the MON command is as follows:

$$\text{MON} \left\{ \begin{matrix} \text{SD} \\ \text{SE} \\ \text{SDE} \end{matrix} \right\} xxxxxx$$

The fields of this command are separated by one or more spaces. The second field selects one of the global CMS statistics categories, SD, SE, or both. A minus sign (hyphen) in this field indicates a null. The third field is an integer decimal number. This is the number of seconds between monitor outputs to the system console. The monitor output contains a heading line, SD, SE, both categories of statistics, or just a heading line. This header gives the elapsed time since the last monitor output and the average input and output total messages per second in this period. Note that all counts are reset to zero at the beginning of each monitor period, so that the figures given represent activity in that period only. The minimum allowed frequency of monitor outputs is 20 seconds; any lower figure entered is rounded up to 20 without comment. The maximum is 262,143 seconds; any higher figure may yield unpredictable results.

For example:

MON SDE 60

Requests output of SD and SE statistics every 60 seconds.

MON - 30

Requests change of output frequency to 30 seconds, without changing the output categories. If no categories are currently reporting, the header line only is output every 30 seconds.

The third field, giving number of seconds, is an optional field. When absent, the MON command is a request to output the specified category immediately. In this case, it is not repeated, since no repeat interval is given.

For example:

MON SE

Requests immediate, one-time output of SE statistics.

MON

Requests immediate, one-time output of the monitor heading line.

2.2.3.2. FINM (Finish Monitor) Command

The syntax of the FINM monitor command is as follows:

```
FINM { SD  }
     { SE  }
     { SDE }
```

The fields of this command are separated by one or more spaces. The second field selects one of the global CMS statistics categories, SD, SE, or both. This command requests termination of the periodic monitor outputs to the system console. This may be done on an individual statistics category basis. Complete cessation of all monitor outputs is requested by the command FINM with no second field.

2.2.3.3. ST (Statistics) Command

The syntax of the statistics command is:

```
     { SD  }
ST   { SE  }
     { SDE }
     { ND  { LT  n1,n2,n3... } }
     {     { PE  a/b,c/d...   } }
     {     { DT  p1,p2,p3...  } }
```

The function of this command is to reset the statistics counters to zero in the categories specified in the second field. Note that the Network Data statistics counters are maintained in CMS system buffers and that these buffers are allocated to the entities specified, if these activities are not already maintaining statistics. There is a limit, set at system generation time, on the maximum number of GCS or C/SP network entities that may gather statistics at any one time. If this limit is exceeded for any entity type, a warning message is output, and command processing is terminated.

2.2.3.4. SP (Statistics) Command

The syntax of the statistics print command is:

```
        ( SD                                          )
        ( SE                                          )
        ( SDE                                         )
SP      (          ( LT  n1,n2,n3...  )               )
        ( ND       ( PE  a/b,c/d...   )               )
        (          ( DT  p1,p2,p3...  )               )
        ( ALL                                         )
```

The function of this command is to print out the values of the statistics counters of the categories specified. The Network Data category statistics counters named in this command are also terminated by this command. Note that the SD and SE categories are permanently enabled, and are not so affected. The keyword ALL requests print of SD, SE categories and all counters of Network Data category enabled at the time, and is used to reset counters to zero in the SD, SE categories and for as many ND entities as the system generation maximums for these entities will allow. All Network Data statistics gathering enabled at the time is thus terminated by such a command.

2.2.4. CMS Print File Handling

The BRKPT keyin has the format:

II *run-id* BRKPT

This closes off and prints the current CMS print file, and starts a new print file. If BRKPT keyin is not used, there will be one print file for each CMS run.

2.2.5. CMS Termination

2.2.5.1. TERMI Keyin

The TERMI keyin requests normal termination of CMS without saving the network recovery file. It is entered from the computer console via the II keyin EXEC request. The format is:

II *run-id* TERMI

This deletes the network recovery file. Thus the next run of CMS initializes the network file. This keyin should be used when removing a CMS with an old network which is to be replaced by a CMS with a new network.

2.2.5.2. TERMR Keyin

The TERMR keyin requests normal termination of CMS with preservation of the network recovery file. It is entered from the computer console via the II keyin EXEC request. The format is:

II *run-id* TERMR

This prevents the deletion of the network recovery file. Thus when the next run of CMS is made, the copy of the network is loaded from the network recovery file.

2.2.5.3. TERME Keyin

The TERME keyin requests an error termination of CMS with dump and trace, with preservation of the network recovery file. It is entered from the console via the II keyin EXEC request. The format is:

II *run-id* TERME

Whereas the other TERM keyins cause termination to commence when all other work is done, TERME forces termination immediately. If the standard runstream CMSRUN is used to start CMS, CMSDMP and CMSTRC are started automatically from CMSRUN following this type of termination. The network recovery file is not deleted.

The TERM keyin (TERMI, TERMR, or TERME) is the recommended method of bringing CMS down. An E *runid* or X *runid* keyin can hang the RSI output activity. If any terminals are in demand mode and the RSI output activity is waiting for output then CMS is hung until it gets some output. This situation can be remedied by:

SM *site-id* T

to terminate the outstanding RSI solicit for this terminal.

In addition to the above difficulties, an E or X keyin forces the termination of the entire run, so any dump or trace processing cannot be accomplished in the same run.

2.2.5.4. Dump and Trace Analysis

2.2.5.4.1. Automatic Dump Processing

If CMS has been started via the standard CMSRUN runstream, automatic dump processing on error termination is available. When CMS is terminated via the II *run-id* TERME keyin or if CMS aborts because of a fatal contingency, the dump processing is started automatically.

When CMS terminates with a fatal contingency (program logic error), the following messages are displayed:

runid ABORT

CMS CONTINGENCY *xxxxxxxxxxxx*

where *xxxxxxxxxxxx* is an octal code defining the contingency error. The following message is displayed by the runstream on the system console when the CMS dump has been saved:

CMS7 MAY BE RESTARTED NOW

When dump analysis begins, the following reply message is displayed by the runstream on the system console:

DUMP STARTED. ENTER REASON FOR DUMP

Any textual response may be entered.

2.2.5.4.2. CMS Dump (CMSDMP Runstream)

If CMS is terminated with an E *runid* keyin, a dump-file is available but is not processed automatically since the entire run is terminated. The dump file can be processed using CMSDMP, a standard runstream located in the utility file. This runstream can be started from demand, with a card deck, or from the system console with the keyin:

ST *qual**UTILITY.CMSDMP,,,*account-number*

The latest CMS post mortem dump is processed. If the trace file is available it is also processed. The following message is displayed by the runstream on the system console when the CMS dump file has been saved:

CMS MAY BE RESTARTED NOW

When dump analysis begins, the following reply message is displayed by the runstream on the system console:

DUMP STARTED. ENTER REASON FOR DUMP

Any textual response may be entered.

2.2.5.4.3. No Dump Available

When CMS is terminated with an X *runid* keyin, the dump file is not used and there is no way to do a dump. However, it is possible to obtain a trace file analysis at this point (see 2.2.5.4.4) if the audit file cycle number is known.

2.2.5.4.4. CMS Trace (CMSTRC Runstream)

Any trace file created by CMS may be processed by CMSTRC (a run in the utility file). Trace file analysis may be initiated at any time on any audit file cycle not currently in use by CMS (for a discussion of audit file cycles, see 2.2.6). The current audit file cycle should be closed (II *run-id* AUDCLS) before beginning the trace.

The trace analysis may be started from demand, with a card deck, or from the system console with the keyin:

ST *qual**~~UTILITY~~FILE.CMSTRC,,,*account-number*

This utility responds with the following message:

ENTER ABSOLUTE CYCLE NO. IN DECIMAL

The operator responds with the audit file cycle number that is to be edited, or END to terminate the utility. If this file cycle cannot be assigned, the following message is displayed:

CMSAUD FILE ASSIGN FAILED

Otherwise, the utility responds with the following message:

EDIT AUDIT-TRACE *** ANS: ALL/SEL

A response of ALL causes all audit points to be edited. If only selected audit points are to be edited the response is SEL. A response of END will terminate the utility. If the response is SEL, the ility will respond with the following message:

ENTER AUDIT-TRACE-NUMBER *** ALL/NBR/GO

The response ALL will request that all audit points be included in the edit. A number response is the number of an audit point (see 2.2.6) to be included in the edit. The message is repeated for each number entered. When all the required audit points have been requested, the operator responds with GO. The edit utility will then edit and print the audit file.

2.2.6. Audit or Trace Functions

The audit or trace function provides a running trace of the actions of CMS which is written to a mass storage file for later editing and printing. This function is available only if CMS Trace code is turned on when CMS is built. The operator can turn each audit point on or off and can close off the old audit file and begin a new one. In addition, the trace functions can be operated without a mass storage file assigned, running as an "in-storage" trace. This is useful when even the overhead of a blocked asynchronous I/O request is undesirable.

2.2.6.1. Turn Audit Functions On/Off (AON, AOF)

To turn an individual audit point on or off in CMS, the operator enters:

$$\text{II } \textit{run-id} \left\{ \begin{matrix} \text{AON} \\ \text{AOF} \end{matrix} \right\} \textit{xx}$$

where *xx* is the number of the audit point, in decimal, from 0 to 62. If an invalid audit point number is specified, CMS responds:

keyin INVALID KEYIN

Otherwise, CMS responds with an echo of the operator-entered message, with time of day added

The CMS standard audit points are as follows: (Additional audit points may be present in user owr code, tailored to individual site requirements.)

Audit Point	Audited Data
1	On an AON or AOF keyin, audit the audit flagbox location that controls which audit points are turned on or off.
3	On a DCP channel input interrupt, trace the channel name and device status buffer (1100/60/80) or the channel name, external function word and interrupt status word (non-1100/60/80).
4	On a DCP channel output interrupt, trace the channel name, external function word, and device status buffer (1100/60/80) or channel-name, external function word and interrupt status word (non-1100/60/80).
5	Audit the first 12 words of each input PDU at the start of network p oco analysis (TSTN)

When CMS terminates, the following message is displayed:

AUDIT FILE CYCLE *nnn* IS FREE

The current cycle of the audit file may be freed, and a new cycle started at any time by the keyin

II *run-id* AUDCLS

CMS responds:

AUDIT FILE CYCLE *nnn* IS FREE

NEW AUDIT FILE CYCLE IS *mmm*

where *mmm* is 1 greater than *nnn*. Freeing an audit file cycle in this manner allows that cycle tc be analyzed and printed by the trace file editor (see 2.2.5.4.4 on CMSTRC) for visual inspection.

The operator may prevent assignment of a new audit file cycle during initialization by turning on "audi point 0."

II *run-id* AON 0

"Audit point 0" is a special case that does not control a particular audit point in CMS, but control whether or not an audit file cycle is to be acquired. Thus, to change from a mass storage file trace to a wholly "in-storage" trace, the operator turns on "audit point 0" as shown above and then closes the current audit file cycle (II *run-id* AUDCLS). CMS responds to the closure with the single message

AUDIT FILE CYCLE *nnn* IS FREE

Audit file functioning continues, according to which audit points are turned on, but stores data in mair storage only. A much smaller trace will be available to the user. To revert to a mass storage file "audit point 0" is cleared (II *run-id* AOF 0) and the "in-storage" mode closed (II *run-id* AUDCLS).

2.2.6.3. Effects of CMS Termination on Audit Functions

If CMS is terminated with an E or X keyin by the operator, the last AUDIT blocks in the TRACE D-Banl are not written to the CMSAUD file and the dump analyst must get the last information from the PMI or FLIT analysis dumps.

If CMS terminates via the TERMI or TERMR keyins, CMSTRACE is given control prior to issuing thi EABORT$ or EXIT$ call for termination, at which time it puts a normal termination record (AUDIT typ 63) into the buffer with two words of user data. This data is the final contents of the AUDIT FLAGBO and is written in the last BLOCK to the CMSAUD file.

2.2.6.4. Analysis of Audit File

The audit file is analyzed by the CMSTRACE routine, which is executed via the runstream CMSTR or automatically after an error termination. (see 2.2.5.4.4, CMSTRACE).

At any time during CMS execution or after CMS terminates and before it is started again the CMSAUI file may be edited using the CMSTRACE Program (see 2.2.5.4.4).

6	Audit the first 12 words of each output PDU at the completion of network protocol building (TSTN).
7	On a call to the CMS error message handler (CMSERR) audit the error message handler input parameter word and the address of the error handler call.
9	When CMS sends a 'RESET' request to the DCP for a particular port, all input data for that port is discarded until a 'Reset Confirmation' is received. This point audits the first 12 words of each discarded PDU.
10	For terminals in demand mode or REM1 devices, trace the input terminal PID and the first 28 words of data sent to the EXEC, including the RSI$ packet.
11	For terminals in demand mode or REM1 devices, trace the output terminal PID and the first 48 words of output data received from the EXEC, including the RSI$ packet.
12	For terminals in demand mode or REM1 devices, trace the acknowledgements for data sent to the EXEC.
15	On a DCP channel input data transfer, trace the channel name and the first 15 words of input data.
16	On a DCP channel output data transfer, trace the channel name and the first 15 words of output data.
30	For input batch devices using RB1 protocol, trace the RB1 data presented to RB1 IN by the CSU.
31	For input remote batch devices using RB1 protocol, trace the NTR protocol, a translation of the RB1 protocol, presented to NTR by RB1 IN.
32	For output remote batch devices using RB1 protocol trace the NTR protocol presented to RB1 OUT by NTR.
33	For output remote batch devices using RB1 protocol trace the RB1 protocol, a translation of NTR protocol which is enqueued for output.

2.2.6.2. Control of the Audit File (AUDCLS and AUDIT POINT 0)

The mass storage file assigned by CMS for storing trace data is one of a set of files called an f-cycle set. These files all have the same name (in this case, CMSAUD), but are distinguished by different cycle numbers. These cycle numbers range from 1 to as high as 999, but only the last 32 files of an f-cycle set are allowed to exist at any one time. The first cycle number used by CMS for the audit file is normally 1.

When trace code is turned on in CMS, the trace file is initialized during CMS initialization. This is indicated by the console message:

NEW AUDIT FILE CYCLE IS *nnn*

where *nnn* is a decimal number.

2.2.7.4. Snap the CMS D-Bank (DT)

number DT

The D-bank, Network, Bufferpools, and COMPOOL are snapped to the print file, and the print file is breakpointed as if the BRKPT command (see 2.2.4) had been given.

2.2.7.5. Read and Execute Storage Changes From Data-File (DR)

number DR *filename* (1 to 48 characters)

The SDF datafile contains the storage change cards. The format of a card is:

address	from column 1 to 6
blank	column 7
content	from column 8 to 19

The filename is any filename acceptable to the EXEC and can include qualifier, cycle number, or keys

2.2.7.6. Set Breakpoint Address (SB)

number SB *address* { P / WR / RW / R / W } *mask*

When trace processing is performed automatically within the CMSRUN runstream following a CMS fatal contingency, or operator abort, these trace utility messages are not produced. The utility wil perform a full edit on the latest trace file.

Processing stops when the designated address is referenced by:

P = Program Register containing the address
R = Reading the address
W = Writing into the address
RW, WR = Either reading or writing

2.3. CMS Network Control Functions

There are two groups of network control functions. The GCS functions operate primarily on the devices operated through the GCS, CTMC, or C/SP control units. Some of these functions also work with Telcon systems sessions (devices or terminals). The second set of functions work with Telcor entities only.

2.3.1. Using CMS Network Control Functions

Network control functions are entered from the Series 1100 operator's console via the II keyin EXEC function. The format of the II keyin is as follows:

II *run-id*

2.2.7. CMS Debugging Aids (DKEYINS)

The Debugging Aids commands are supported by the CMS routine DKEY and only available if CMS Debug code is turned on (see DEBUG SGS). Debugging Aids commands can be entered only from the computer console via the II keyin EXEC request. The format is:

II *run-id* DKEYIN

CMS responds with:

number ENTER DKEYIN

The operator then keys in:

number command

When all DKEYINs have been entered, the operator keys in:

number END

Notations used are:

Address	6-digit octal storage address
Content	12-digit octal value of storage location
Length	6-digit octal value: length of the storage snapshot (number of words)
Mask	2-digit octal value of the breakpoint mask
Count	1-digit octal value: number of consecutive storage locations to be displayed.

2.2.7.1. Storage Change (DC)

number DC *address content*

The given storage location is changed, and both the new contents and the previous contents are displayed in the form:

address contents previous-contents

2.2.7.2. Storage Snap (DS)

The locations given are snapped to the print file and the print file is breakpointed as if the BRKPT command (see 2.2.4) had been given.

number DS *address length*

2.2.7.3. Inspect Storage (DI)

number DI *address [count]*

Displays the content of one to seven storage locations. One location is displayed if count is omitted.

p_1, p_2 PIDs
p_1, p_2 are 1 to 4 digit decimal numbers

j, k, l are decimal numbers in a range of 0-63

devnam is a 6-character or less device name associated with the device. This name is the same as used in the Series 1100 EXEC system generation.

2.3.2.2. General Error Messages (GCS)

- TABLE VALUE OUT OF RANGE – LTT, PE, or PID number could not be found in network tables.
- *keyin* SYNTAX ERROR – unrecognizable input
- GCS KEYIN WITH TELCON ENTITY – LTT, PE, or PID number on last keyin referred to a Telcon entity.

2.3.2.3. GCS Operator Keyins—Explanation of Each Command

2.3.2.3.1. /NFS LT*n* (Display Network Facility Status of LTT)

Displays the status of the given line (LTT) in the following format:

LTT *n* IS { NOT ASSIGNED / ASSIGNED ON *devnam* }

'DO NOT POLL' IS SET FOR POLL ENTITIES { *a,b,c,...* / NONE }

'SPECIFIC POLL' IS SET FOR POLL ENTITIES { *a,b,c,...* / NONE }

'INPUT HOLD' IS SET FOR POLL ENTITIES { $p_1,p_2,p_3\ldots$ / NONE }

'OUTPUT HOLD' IS SET FOR POLL ENTITIES { $p_1,p_2,p_3\ldots$ / NONE }

'ALT-ADDRESS' IS SET FOR POLL ENTITIES { $p_1,p_2,p_3\ldots$ / NONE }

2.3.2.3.2. /NFS PE *a/b* (Display Network Facility Status of PET)

Display status of Poll Entity (PET) in the following format:

STATUS OF PE *a/b*

'DO NOT POLL' IS { SET / CLEAR }

CMS responds with:

number ENTER FUNCTION

The operator then enters:

number command

and CMS again responds with:

number ENTER FUNCTION

When all desired commands have been entered, the operator keys in:

number END

to terminate Network Control Mode.

GCS commands (see 2.3.2) must be preceded by a sentinel character defined at system generation time. The system default is "/". Telcon commands (U,D,FREE,S, and SW) must not be preceded by this sentinel.

When GCS commands are entered from the specially configured GCS Network Monitor Terminal, the II keyin is not necessary. Any input preceded by the GCS sentinel character (default is '/') is assumed to be a GCS command.

2.3.2. GCS Functions

GCS network control functions allow the operator to display or change the states of GCS entities (PIDs, PETs, and LTTs), and manipulate the message queues of both GCS and Telcon entities. These functions may be entered from the operator's console via the II keyin (see 2.3.1) or from the Network Monitor Terminal (see 2.2.2.2).

2.3.2.1. GCS Command Format

The general form of most GCS commands is as follows:

$$command \left\{ \begin{array}{l} LTT\ n \\ PE\ a/b \\ DT\ p_1,p_2 \end{array} \right\} \quad j,k,l \quad devnam$$

Each GCS command must be preceded by a sentinel character defined at system generations. The system default, "/", is used here.

The other notations are:

n LTT number

a LTT number

b PE number relative to LTT *a*
n, a, b are 1 to 4 digit decimal numbers

2.3.2.3.5. /ACT LT *n* (Assign and Activate a Line)

If *n* is within range the proper line initialization routine is called. This is equivalent to bringing up a line.

The normal response is:

LTT *n* INITIALIZED ON *devnam*

The error responses are:

ACT LT *n* *devnam* DOWN
ACT LT *n* *devnam* ASSIGNED
ACT LT *n* *devnam* NOT IN SYSTEM
ACT LT *n* CSF$ STATUS = *xxxxxx*

2.3.2.3.6. /DNP PE *a/b* (Do Not Poll PET)

If the LT number and the PE number are within range, the polling is stopped on all devices on the given Poll Entity. This is equivalent to downing a PET.

The normal response is:

PE *a/b* IS MARKED 'DO NOT POLL'

The error response is:

DNP PE *a/b* - 'DO NOT POLL' IS SET

2.3.2.3.7. /RSP PE *a/b* (Resume Polling on PE)

If the LT number and the PE number are within range, polling is resumed on all devices on the Poll Entity that do not have input hold set (see 2.3.2.3.13). This is equivalent to upping a PET.

The normal response is:

PE *a/b* HAS BEEN ACTIVATED

The error response is:

RSP PE *a/b* - DNP WAS NOT SET

2.3.2.3.8. /HLD DT p_1 (Hold Output to PID)

Stop all output to device with PID p_1. All items queued for output are moved to the deferred queue.

The normal response is:

OUTPUT TO PID.p_1 IS NOW HELD

'SOFTWARE HOLD' IS { SET / CLEAR }

'NO RESPONSE' IS { SET / CLEAR }

'FACILITIES TIGHT' IS { SET / CLEAR }

'INPUT HOLD' IS SET FOR PIDS { $p_1,p_2,p_3,\ldots$ / NONE }

'OUTPUT HOLD' IS SET FOR PIDS { $p_1,p_2,p_3,\ldots$ / NONE }

'ALT-ADDRESS' IS SET FOR PIDS { $p_1,p_2,p_3,\ldots$ / NONE }

2.3.2.3.3. /NFS DT p_1 (Display Network Facility Status of PID)

Display the status of the device with PID p_1 in the following format:

STATUS OF DEVICE p_1

'INPUT HOLD' IS { SET / CLEAR }

'OUTPUT HOLD' IS { SET / CLEAR }

'ALT-ADDRESS' IS { P_2 / CLEAR }

where P_2 is the device to which traffic is rerouted

2.3.2.3.4. /DWN LT *n* (Down and Free LTT)

If *n* is within range the proper line termination routine is called to down and free the named lin

The normal response is:

LTT *n* TERMINATED ON *devnam*

The error responses are:

DWN LT *n* *devnam* DOWN
DWN LT *n* *devnam* IS ALREADY FREE
DWN LT *n* *devnam* NOT IN SYSTEM
DWN LT *n* CSF$ STATUS = *xxxxx*

The error response is:

HLD DT p_1 - OUTPUT ALREADY HELD

2.3.2.3.9. /HLD PE *a/b* (Hold Output on PET)

Output is stopped on all devices on the given Poll Entity Table (PET). All items queued for output are moved to the deferred queue by message queueing.

The normal response is:

OUTPUT HELD ON PE *a/b*

The error response is:

HLD PE *a/b* - OUTPUT ALREADY HELD

2.3.2.3.10. /REL DT p_1 (Release Output Hold on PID)

Resume output to device with PID p_1. All items on the deferred queue are moved to the main queue.

The normal response is:

PID p_1 MAY NOW RECEIVE OUTPUT

The error response is:

REL DT p_1 - WAS NOT HELD

2.3.2.3.11. /REL PE *a/b* (Release Output Hold on PET)

Resume output to all devices on given PET. All items queued on the deferred queue are moved to the main queue.

The normal response is:

OUTPUT MAY BE SENT TO PE *a/b*

The error response is:

REL PE *a/b* - OUTPUT WAS NOT HELD

2.3.2.3.12. /INH DT p_1 (Input Hold on PID)

Throws away all input from the device with PID p_1. Messages will not be selected for output if inpu hold is set.

The normal response is:

INPUT STOPPED FOR PID p_1

The error response is:

INH DT p_1 - INPUT ALREADY STOPPED

2.3.2.3.13. /IRL DT p_1 (Release Input Hold on PID)

Resume input to the device with PID p_1. The normal response is:

INPUT RESUMED FOR PID p_1

The error response is:

IRL DT p_1 - INPUT WAS NOT HELD

NOTE:

If all devices were marked to hold input, it is necessary to do a /RSP PE a/b in order to resume input.

2.3.2.3.14. /ALT DT p_1 TO p_2 (Alternate Address for PID)

All message traffic through the device with PID p_1 is rerouted to the device with PID p_2. All traffic queued for PID p_1 is queued to PID p_2's main queue.

The normal response is:

PID p_1 TRAFFIC REROUTED TO PID p_2

The error responses are:

PID p_1 - TRAFFIC ALREADY REROUTED

ALT DT p_1 TO p_2 - REROUTING NOT POSSIBLE

ALT DT p_1 TO p_1 - NOT POSSIBLE

NOTE:

This command can also be used with Telcon devices (SESSIONS). The PID number for the Telcon session can be obtained via the Status (S) command (see 2.3.3.3.5).

2.3.2.3.15. /RST DT p_1 (Resume Traffic on PID)

This reverses the action of the /ALT (Alternate Addressing) command. Traffic is no longer rerouted from the named device to an alternate device. No requeuing of messages is done.

The normal response is:

PID p_1 WILL RECEIVE TRAFFIC

The error response is:

RST DT p_1 - NO REROUTING WAS IN EFFECT

The response is:

n MSGS DELETED FOR PID p_1 ($0 \leq n \leq m$)

NOTE:

This command can also be used with Telcon devices (SESSIONS). The PID number for the Telcon session can be obtained via the Status (S) command (see 2.3.3.3.5).

2.3.2.3.19. /CHG TO p_1 (Change Network Monitor PID)

Change network monitor terminal to the device with PID p_1.

The normal response given to the new network monitor is:

NETWORK MONITOR IS NOW PID p_1

The response is sent to the new network monitor terminal. No response is sent to the old monitor. It may be necessary to clear the WAIT key to enable subsequent TIP transaction input at the old monitor terminal.

The operator's console is assumed to have a PID of zero. Therefore the Network Monitor Terminal can be switched to the console by the keyin /CHG TO 0.

The error response given to the current network monitor is:

PID p_1 CANNOT BE NETWORK MONITOR

NOTE:

The /CHG TO command can be used from the operator's console at any time. This gives the operator the capability to change the network monitor to PIT p1 at any time. This is important if the monitor has been switched to a terminal which becomes inactive because of a hardware fault.

2.3.2.3.20. /USECLT *devname1*, *devname2* (Change CLT Assignment)

Change communications line assignment to *devname1* from *devname2* The normal response is:

LT N NOW ACTIVE ON *devnam*

The error response is:

NO LINE CONFIGURED ON – *devnam*

2.3.2.3.21. /CPP PE *a/b* TO *j,k,l* (Change Polling Rate on PET)

j represents initial frequency
k represents new polling frequency
l represents maximum number of no-traffic responses from the terminal

NOTE:

This command can also be used with Telcon devices (SESSIONS). The PID number for the Telcon session can be obtained via the Status (S) command (see 2.3.3.3.5).

2.3.2.3.16. /MSG DT p_1 (Message Count on PID)

Display number of messages currently queued for the device with PID p_1. The main queue and deferred queue are both searched, and the total number of messages on both queues is displayed. Messages that are in transit are also counted. If there is a message in transit, a "*" appears before the count number.

The normal response is:

FOR PID p_1
NUM. OF MAIN QUEUE ITEMS = [*]*xxx*
NUM. OF DEFERRED QUEUE ITEMS = [*]*xxx*

NOTE:

This command can also be used with Telcon devices (SESSIONS). The PID number for the Telcon session can be obtained via the Status (S) command (see 2.3.3.3.5).

2.3.2.3.17. /MSG (Outstanding System Output Messages)

Display the number of outstanding output messages in the system and also display the five PIDs with the most messages queued to them. If a message is marked as intransit, then an asterisk (*) is displayed after the number of messages for the individual PIDS.

An example response is:

```
    TOTAL ON MAIN OUTPUT QUEUE    1
    TOTAL ON DEFERRED QUEUE       7
PID 302  MAIN Q   0   DEFERRED   5
PID 303  MAIN Q   1*  DEFERRED   2
```

In this example, there are seven messages on the deferred queue and one message on the main queue. Five are on the deferred queue for PID 302, and two are on the deferred queue for PID 303. One message is on the main queue for PID 303 and it is marked as intransit.

2.3.2.3.18. /DEL DT p_1 m (Delete Messages from PID Deferred Queue)

The first m items from the deferred queue are dequeued and sent to the undeliverable message transaction program.

Messages will be deleted only if all of the following conditions are met:

Alternate addressing is not on (see ALT command)
Output hold is set (see HLD command)
A message is not currently in transit

2.3.3.2. General Error Messages (Telcon)

command SYNTAX ERROR

Illegal or misspelled command

Telcon command preceded by GCS sentinel character

Command or entity-name of more than six characters

Illegal separator between words

Blank line transmitted

entity-name NOT CONFIGURED

No entity with this name exists in Telcon tables

Name field was left blank

command GCS COMMAND WITH TELCON ENTITY

2.3.3.3. Operator Keyins—Explanation of Each Telcon Command

2.3.3.3.1. UP *fep, channel, net, port,* or *session* (U)

The UP command clears the down-flag in the Telcon entity table, making the entity available for input/output, and opens the communication paths to all entities lower in the network hierarchy. For instance, if FEP1 is down, then the I/O path has been blocked to all ports connected to FEP1 and all sessions connected to those ports. When FEP1 is upped, these paths are reopened. The format of the UP command is:

U *entity-name,entity-name,entity-name* ...

If the command is executed successfully, the following message appears for each entity:

entity-name WAS { UP / DOWN } NOW UP

- If the entity is a channel which is not assigned, the channel is automatically assigned to the run. If CMS is unable to assign the channel, the following message is displayed and the channel is not marked up:

  channel-name CANNOT BE ASG'D, FAC STATUS *xxxxxxxxxxxx*

  where *xxxxxxxxxxxx* is the facility status returned by the EXEC (see SPERRY UNIVAC Series 1100 Executive System, Volume 2 EXEC, Programmer Reference, UP-4144.2 (current version) for explanation of status).

The normal response is:

PE *a/b* NEW POLL RATES *j,k,l*

The error response is:

CPP PE *a/b* - VALUE RANGE ERROR

2.3.3. Telcon Network Functions

Network control functions allow the operator to display or change the states of certain Telcon entities or switch subnetworks (NETs) from one Front End Processor (FEP) to another. These functions may be entered from the computer console using the II keyin EXEC Function (see 2.3.1).

Network entities include:

Front End Processors (FEPs)
Channels
Sub-Networks (NETs)
Ports
Terminal Sessions

2.3.3.1. Telcon Command Format

The format of Telcon commands U, D, S, and FREE is:

command entity-name,entity-name,entity-name ...

where at least one entity-name must appear. The list of entity-names may be separated by either spaces or commas.

The format of Telcon command SW is:

SW { *fepid* / *netid* } TO *fepid*

where *fepid* identifies a FEP and *netid* identifies a NET

The Telcon commands must not be preceded by the GCS sentinel character (see 2.3.2).

NOTE:

The Telcon commands require alphanumeric device names. PID, PET, or LTT numbers are not recognized by these commands.

Telcon commands cannot be applied to GCS-type entities. The only GCS commands which can be applied to Telcon entities are the four GCS commands which deal with message queueing: ALT, RST, MSG, and DEL. (See 2.3.2 for use of these commands).

- Resume Input to a Device

  /IRL DT p_1

- Hold Output to a Device

  /HLD DT p_1

- Release Output Hold on Device

  /REL DT p_1

- Alternate Address Traffic from One Device to Another

  /ALT DT p_1 TO p_2

- Resume Traffic on Device (Rescind ALT Command)

  /RST DT p_1

  p_1 is the original PID

- Message Count on PID Queue

  /MSG DT p_1

- Outstanding Output Messages in the System

  /MSG

- Change CLT Assignment from Second to First

  /USECLT *ss/uu/cc,ss/uu/cc* (new CLT, old CLT)

- Change Network Monitor PID

  /CHG TO p_1

- Delete *m* Messages from PID Queue

  /DEL DT p_1 *m*

2.5. Summary of Telcon Commands

- Up FEP, NET, channel, port, or session

  U *entity-name, entity-name, entity-name ...*

- Down FEP, NET, channel, port, or session

  D *entity-name, entity-name, entity-name ...*

2.4. GCS/CTMC/CSP Commands

- Assign and Activate an LTT

  /ACT LT *n*

- Deactivate and Free an LTT

  /DWN LT *n*

- Network Facility Status of LTT

  /NFS LT *n*

- Network Facility Status of PE

  /NFS PE *a/b*

- Network Facility Status of Device

  /NFS DT p_1

- Do Not Poll PE

  /DNP PE *a/b*

- Resume Polling on a Poll Entity

  /RSP PE *a/b*

- Hold Output to All Devices on a Poll Entity

  /HLD PE *a/b*

- Resume Output to All Devices on a Poll Entity

  /REL PE *a/b*

- Change Polling Rate on a Poll Entity

  /CPP PE *a/b* TO *j,k,l*

  where:

  j represents the initial frequency
  k represents the current frequency
  l represents the maximum number of no-traffics

- Put Input Hold on Device

  /INH DT p_1

- Free Channel

  FREE *channel-name, channel-name, channel-name ...*

- Status of FEP, NET, channel, port, or session

  S *entity-name, entity-name, entity-name ...*

- Switch nets from one fep to another

  SW *net-name* TO *fep-name*

  SW *fep-name* TO *fep-name*

2.6. GCS Commands Usable on Telcon Entities

- Alternate Address (Reroute Traffic to Alternate PID)

  /ALT DT p_1 TO p_2

- Resume Traffic on PID (Rescind Alternate Address)

  /RST DT p_1

  p_1 is the original PID

- Retrieve the Count of Messages Queued for a Device

  /MSG DT p_1

- Retrieve the number of outstanding output messages in the system and display the five PIDs with the most outstanding messages

  /MSG

- Delete *m* Messages from PID Queue

  /DEL DT p_1 *m*